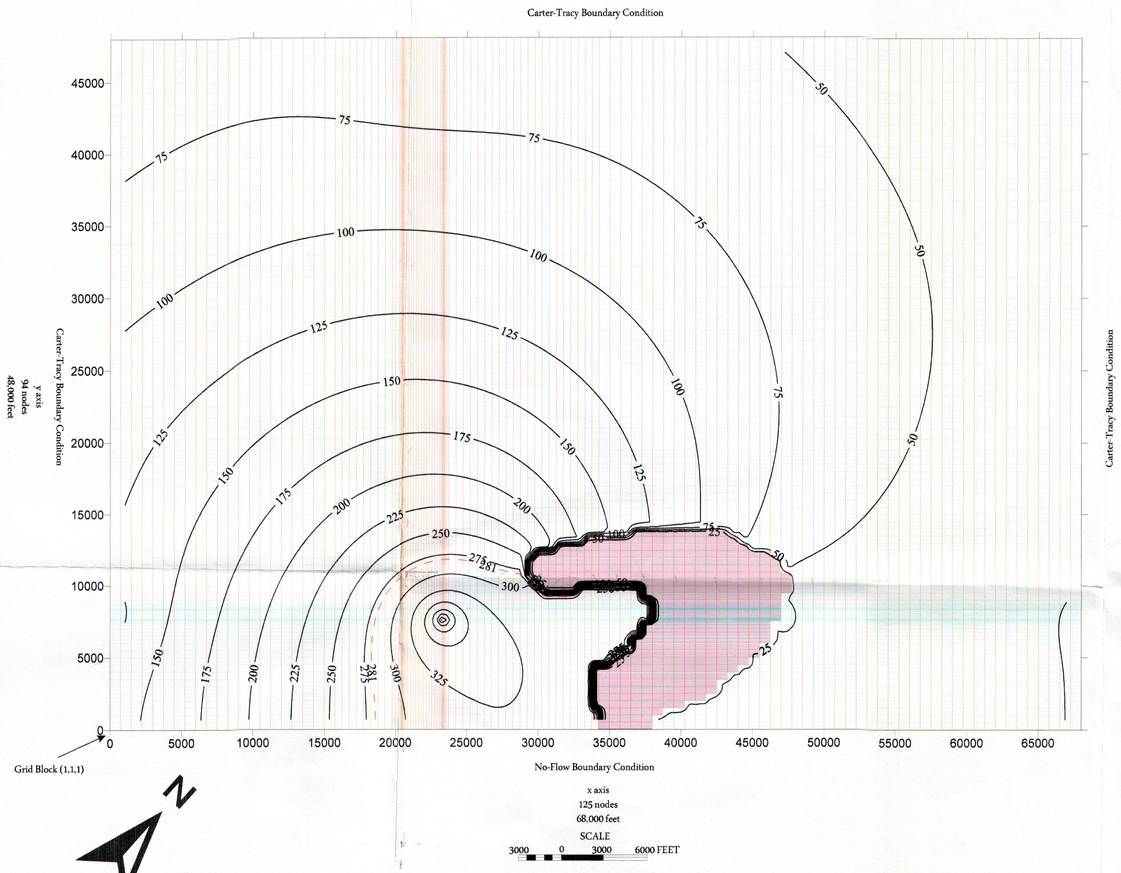
ExMob_Dprs_A



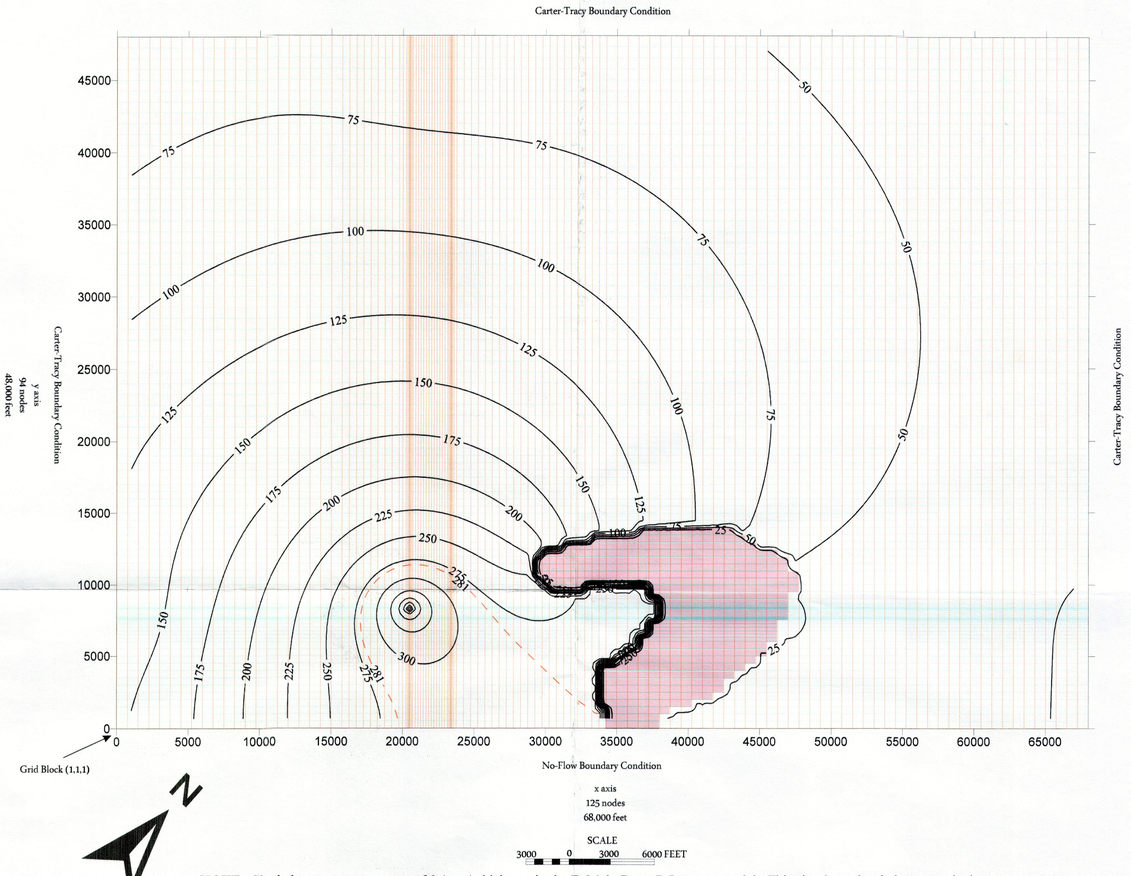
NOTE: Shaded area represents area of 0 (zero) thickness in the ExMob_Dprs_A Pressure model. This simulates the shale out or pinchout of the Frio D Sand. The shaded grid cells were made inactive via use of the R1-26 (FPV=0) Card.

SWIFT Input File No.:	Model Run Description	Input Parameters	Parameter Value
ExMob_Dprs_A.dat	Reservoir pressure buildup at end of operations in Frio D Sand. Historical injection into WDW-397 from July 1, 2008 until December 31, 2008 at 140 gpm. Future injection into WDW-397 at 360 gpm from January 1, 2009 until December 31, 2020.	Reservoir Flow Capacity	16,250 mD-ft
		Hydraulic Conductivity	3.734 ft/day
		Intrinsic Permeability (k)	650 mD
		Porosity	0.28
		Reservoir Thickness (h)	25 ft
		Reservoir Dip	variable structure
		Injectate Density	64.49 lb/ft^3@ 164°F
		Injectate Specific Gravity	1.05 @ 60°F
		Injectate Viscosity*	0.452 cP @ 164°F
		Reservoir Brine Density	66.27 lb/ft^3@ 164°F
		Reservoir Brine Specific Gravity	1.083 @ 60°F
		Reservoir Brine Viscosity*	0.507 cP @ 164°F
		Groundwater Flow Rate	0.0 ft/yr
		Rock Compressibility	3.20 x 10^{-6} psi^{-1}
		Fluid Compressibility	2.43 x 10^{-6} psi^{-1}
		Reservoir Temperature	164°F
		SWIFT Effective Diffusion Coefficient	7.93 x 10^{-4} ft^2/day
		Longitudinal and Lateral Dispersivity	100 ft and 10 ft

* variable viscosity with temperature from 60°F to 200°F

MODEL RESULTS SUMMARY: The maximum pressure buildup at the WDW-397 occurs on December 31, 2020. The reference depth for the model predicted bottom-hole pressures is 6,618 feet subsea. The maximum predicted flowing bottom-hole grid block pressure on December 31, 2020 is 3,478 psia. The maximum predicted flowing bottom-hole well bore pressure on December 31, 2020 is 3,600 psia. The pre-injection native static reservoir pressure is 2,884 psia. Therefore, the pressure buildup in the grid block cell is no more than 594 psi and the pressure buildup predicted at the well is no more than 716 psi. The cone of endangering influence includes the area within the pressure isopleth representing a 281-psi increase in reservoir pressure.

ExMob_Dprs_B



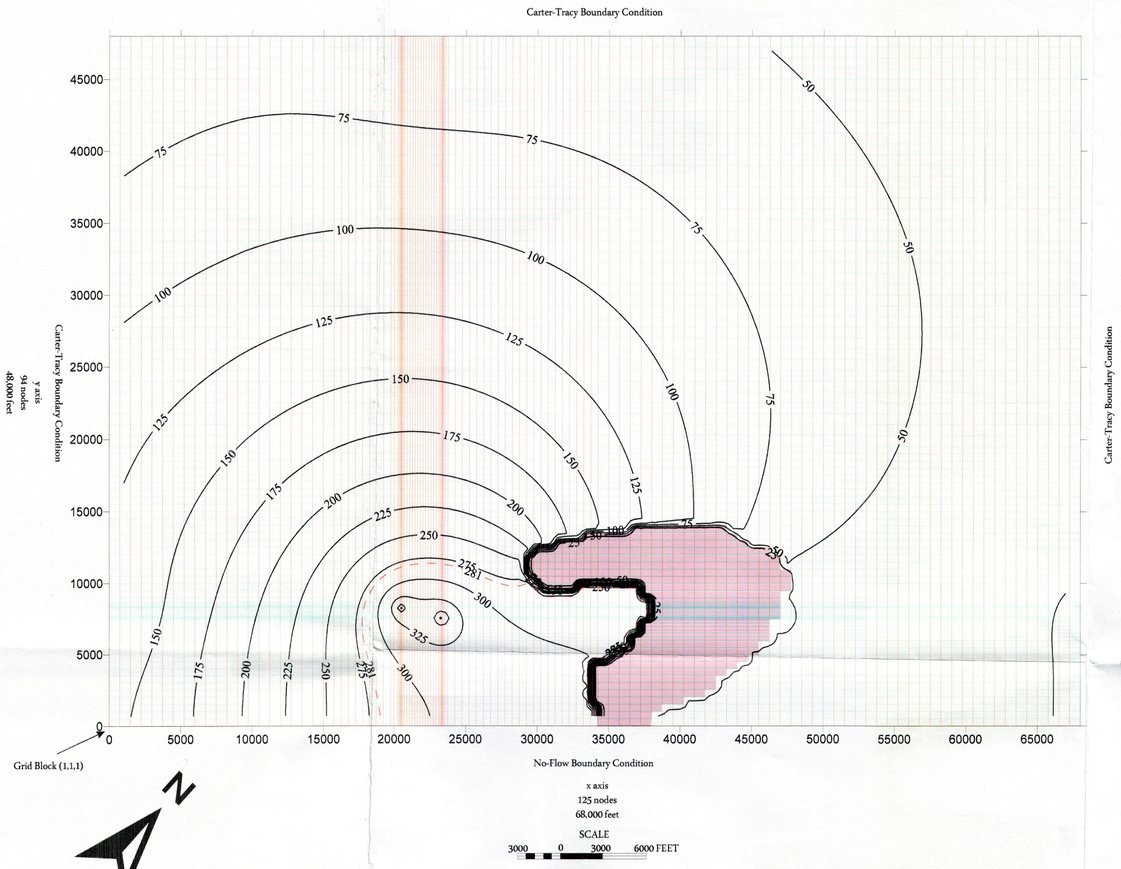
NOTE: Shaded area represents area of 0 (zero) thickness in the ExMob_Dprs_B Pressure model. This simulates the shale out or pinchout of the Frio D Sand. The shaded grid cells were made inactive via use of the R1-26 (FPV=0) Card.

SWIFT Input File No.:	Model Run Description	Input Parameters	Parameter Value
ExMob_Dprs_B.dat	Reservoir pressure buildup at end of operations in Frio D Sand. Historical injection into WDW-397 from July 1, 2008 until December 31, 2008 at 140 gpm. Future injection into WDW-398 at 360 gpm from January 1, 2009 until December 31, 2020.	Reservoir Flow Capacity	16,250 mD-ft
		Hydraulic Conductivity	3.734 ft/day
		Intrinsic Permeability (k)	650 mD
		Porosity	0.28
		Reservoir Thickness (h)	25 ft
		Reservoir Dip	variable structure
		Injectate Density	64.49 lb/ft^3@ 164°F
		Injectate Specific Gravity	1.05 @ 60°F
		Injectate Viscosity*	0.452 cP @ 164°F
		Reservoir Brine Density	66.27 lb/ft^3@ 164°F
		Reservoir Brine Specific Gravity	1.083 @ 60°F
		Reservoir Brine Viscosity*	0.507 cP @ 164°F
		Groundwater Flow Rate	0.0 ft/yr
		Rock Compressibility	3.20 x 10^{-6} psi^{-1}
		Fluid Compressibility	2.43 x 10^{-6} psi^{-1}
		Reservoir Temperature	164°F
		SWIFT Effective Diffusion Coefficient	7.93 x 10^{-4} ft^2/day
		Longitudinal and Lateral Dispersivity	100 ft and 10 ft

* variable viscosity with temperature from 60°F to 200°F

MODEL RESULTS SUMMARY: The maximum pressure buildup at the WDW-398 occurs on December 31, 2020. The maximum predicted flowing bottom-hole grid block pressure on December 31, 2020 is 3,469 psia. The maximum predicted flowing bottom-hole well bore pressure on December 31, 2020 is 3,590 psia. The pre-injection native static reservoir pressure at WDW-398 is 2,902 psia. Therefore, the pressure buildup in the grid block cell is no more than 567 psi and the pressure buildup predicted at the well is no more than 688 psi. The cone of endangering influence includes the area within the pressure isopleth representing a 281-psi increase in reservoir pressure.

ExMob_Dprs_C



NOTE: Shaded area represents area of 0 (zero) thickness in the ExMob_Dprs_C Pressure model. This simulates the shale out or pinchout of the Frio D Sand. The shaded grid cells were made inactive via use of the R1-26 (FPV=0) Card.

SWIFT Input File No.:	Model Run Description	Input Parameters	Parameter Value
ExMob_Dprs_C.dat	Reservoir pressure buildup at end of operations in Frio D Sand. Historical injection into WDW-397 from July 1, 2008 until December 31, 2008 at 140 gpm. Future injection into WDW-397 and WDW-398 at 180 gpm (each) from January 1, 2009 until December 31, 2020.	Reservoir Flow Capacity	16,250 mD-ft
		Hydraulic Conductivity	3.734 ft/day
		Intrinsic Permeability (k)	650 mD
		Porosity	0.28
		Reservoir Thickness (h)	25 ft
		Reservoir Dip	variable structure
		Injectate Density	64.49 lb/ft^3@ 164°F
		Injectate Specific Gravity	1.05 @ 60°F
		Injectate Viscosity*	0.452 cP @ 164°F
		Reservoir Brine Density	66.27 lb/ft^3@ 164°F
		Reservoir Brine Specific Gravity	1.083 @ 60°F
		Reservoir Brine Viscosity*	0.507 cP @ 164°F
		Groundwater Flow Rate	0.0 ft/yr
		Rock Compressibility	3.20 x 10^{-6} psi^{-1}
		Fluid Compressibility	2.43 x 10^{-6} psi^{-1}
		Reservoir Temperature	164°F
		SWIFT Effective Diffusion Coefficient	7.93 x 10^{-4} ft^2/day
		Longitudinal and Lateral Dispersivity	100 ft and 10 ft

* variable viscosity with temperature from 60°F to 200°F

MODEL RESULTS SUMMARY: The maximum pressure buildup at the WDW-397 occurs on December 31, 2020. The reference depth for the model predicted bottom-hole pressures is 6,618 feet subsea. The maximum predicted flowing bottom-hole grid block pressure in WDW-397 on December 31, 2020 is 3,334 psia. The maximum predicted flowing bottom-hole well bore pressure in WDW-397 on December 31, 2020 is 3,390 psia. The pre-injection native static reservoir pressure is 2,884 psia. Therefore, the pressure buildup in the grid block cell for WDW-397 is no more than 450 psi and the pressure buildup predicted at the well is no more than 506 psi. The maximum predicted flowing bottom-hole grid block pressure in WDW-398 on December 31, 2020 is 3,339 psia. The maximum predicted flowing bottom-hole well bore pressure in WDW-398 on December 31, 2020 is 3,400 psia. The pre-injection native static reservoir pressure is 2,902 psia. Therefore, the pressure buildup in the grid block cell for WDW-398 is no more than 437 psi and the pressure buildup predicted at the well is no more than 498 psi. The cone of endangering influence includes the area within the pressure isopleth representing a 281-psi increase in reservoir pressure.

PLATE 7-7

TERRA DYNAMICS INC

PRESSURE BUILDUP MODEL GRID AND RESULTS (ExMob_Dprs) (Frio D Sand Pressure Models)

PREPARED FOR

EXXON MOBIL CORPORATION PASADENA, TEXAS

DRAWN BY:	SCALE:	DATE:
tdm	As Indicated	02-02-2011
DESIGNED BY: SAME		JOB NO.: 11-101
CHECKED BY: T. Moody		